

January 29, 2016

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**RE: ARLINGTON SENIOR CENTER RENOVATIONS
MECHANICAL, PLUMBING, ELECTRICAL AND FIRE PROTECTION SYSTEMS
EXISTING CONDITIONS & RECOMMENDATIONS**

Dear Bill,

Thank you to Christine, Fred, and you for the helpful guided tours and stream of helpful information. There are challenges and opportunities ahead. Given the long term nature of this buildings functions our recommendations primarily follow the logic of lowest life cycle cost over 30 years or more. We expect the building will still be serving the community for well longer and therefore benefits from lowest costs over time.

The following describes the mechanical systems, their existing conditions and recommendations for system replacements and or renovations to match intended architectural renovations. We assume the renovation project is to be completed in a single construction project in order to minimize costs, time and disruption. This focus of this schematic/study is on systems that will serve building areas for the senior center which occupies only a portion of the lower two floors of the building and also provides some related information on central building systems.

Existing mechanical, plumbing and most electrical systems are all from the 1984 renovation. The majority of the fire alarm and fire suppression systems were installed in 1984 but it appears that additional work on both was completed more recently. Both the suppression and alarm systems are in good condition and can accommodate the renovations.

AREA OF RENOVATION

Total floor area to be renovated is approximately 18,200 SqFt all on the first two floors. The project may also include a expanded kitchen (commercial standards) adding 600 SqFt.

CODE

At this time we have understood that the level of renovations will not trigger a requirement to bring the rest of the building up to current code standards. However, all new systems installed to serve the renovated areas will have to meet current codes.

FIRE PROTECTION

Existing Condition

The majority of the existing fire suppression system was installed in 1984. The fire suppression water service entry and primary valving appears to have been replaced along with the potable

water meter within the last 10 years. The system was designed to NFPA-13 standards at the time which are largely identical to current code.

Fire Protection System Renovations

1. A new sprinkler head layout will need to be provided of all areas of renovation. The existing system adequately supports this work. Approximately 40% of the piping in these renovated areas can be retained.
2. Commercial Kitchen: Fire suppression in kitchen hood with alarm tie-ins.

PLUMBING

Existing Condition

A new potable water service was provided to the building along with meters and valving during the last 10 years. Domestic hot water (DHW) is provided by a central DHW system and new gas fired tank in the basement including recirculation. The system appears in good condition. Bathrooms are not all fully accessible and there is one new bathroom set of fixtures recently installed that could be considered for reuse.

Plumbing System Renovations

The following are recommended system replacements and renovations to match the architectural renovations:

1. Provide all new plumbing fixtures in bathrooms and kitchens; all to match or exceed code required low flow requirements. Tank type toilets. Floor drains for bathrooms with 2 or more toilets or urinals.
2. Connect to existing waste, vent, and potable piping systems.
3. Insulate all DHW piping old or new in the renovated areas.
4. Balance existing DHW recirculation system to accommodate changes.
5. Commercial Kitchen:
 - Grease trap
 - Triple bowl sink
 - Hand wash sink
 - Floor drains (2)
 - Under sink commercial dishwasher with temperature booster

MECHANICAL

Existing Condition

A pair of gas fired cast iron sectional hot water boilers in the basement provide heat to two primary systems: a multi-zone perimeter baseboard heating system and hot water serving heating coils in most but not all of the air handling units. Large and small air handling units in interior closets and the basement mechanical room provide air conditioning and in many cases heating as well. The air handling units each include fans to move air through the duct systems to the spaces and also include refrigerant systems and coils that are connected by a central piping loop to the new outdoor fluid cooler where the heat of the building is ejected to the atmosphere in summer.

Piping systems throughout the building are mostly from the 1984 renovation and in fair condition. HVAC controls throughout the building are provided by a pneumatic system with some digital thermostats now being used for zone control.

Mechanical System Renovations

We assume the thermal envelope of the building is not being improved by the adding insulation to the exterior walls therefore the basic system capacity of existing systems matches what will be required. A significant exception is the requirement for additional fresh air ventilation to meet current codes.

The following are recommended system replacements and renovations to match the architectural renovations:

1. All of the air handling units serving the renovation areas are past normally expected life spans and should be replaced with equipment sized to serve the renovated areas. Units are fluid cooled A/C units each equipped with hydronic heating coil, refrigerant system, fan section, MERV-12 filters, and connection to cooling hydronic loop, heating hydronic loop, fresh air supply and DDC controls.
 - Quantity of new AHU's = 8.
 - Total cooling capacity = 42 Tons.
2. Duct work, diffusers and grilles should be replaced in all areas.
3. Current ventilation codes must be used to size fresh air requirements and some additional ventilation will need to be provided as compared to the existing systems.
 - All new ventilation duct work to connect existing fresh air supply in basement to all new AHU's; 2000 cfm.
 - New matching exhaust system with exhaust blower and duct work; 2000 cfm
4. Reuse the majority of the existing perimeter heating system.
 - Provide all new zone valves and control.
 - Provide all new drain valves and vents.
 - Rework the majority of baseboard enclosure to match new plans and provide end caps and splice plates where needed; 70% of existing.
 - Add baseboard enclosure and end caps where needed; 30% of existing
5. Central piping systems will need some limited work to adapt to the new AHU's serving the renovated senior center including all new valves, sensors and flexible connections.
 - Quantity of new AHU's = 8.
6. Replacing the entire set of automatic temperature and ventilation controls for the building with a new direct digital controls (DDC) system is strongly recommended and would logically be done at the time of installing new HVAC for the senior center so that the control systems are compatible and integrated. This will provide significant energy savings for the building as a whole.
7. The existing boilers are both very inefficient. We recommend that the older boiler be removed from the boiler room and that a new high efficiency condensing mode boiler be added leaving the newer cast iron unit in place. The new boiler would be controlled using a fixed lead approach so most of the gas used will be burned at the higher efficiency. Sized

the new boiler at around 80% of total design load building requirement This will provide significant energy savings for the building as a whole; likely at least 15% savings on gas for space heat.

- Demo existing boiler.
- Gas condensing mode boiler: 800,000 BTU/Hr.
- New close boiler piping, valves, hangers, and insulation.
- Side wall venting and combustion air intake.

8. Commercial Kitchen:

- Range hood
- Externally mounted exhaust fan
- Make-up air system with fan duct work and exterior termination and interior grilles.
- Welded grease duct to externally mounted exhaust fan

ELECTRICAL

Existing Condition

Power Most of the electrical in the building dates from the 1984 renovation. Unfortunately the primary equipment manufacturer used in that work was Federal Pacific Electric Company (FPE). This company is no longer in business and is notorious for poorly performing equipment. In most cases no new work within these panels, load centers, disconnects can be performed without replacing the FPE equipment as well.

Lighting Most of the light fixtures in the building date from the 1984 renovation. Improvements in lamp type have been made to many of the fixtures. Lighting systems do not all meet current efficiency and code standards. Emergency lighting is provided by heads powered by remote battery packs and battery/light units.

Fire Alarm The fire alarm (FA) system is a Class-A addressable system with dial-out, and an enunciator panel in the entry lobby. The majority of the FA system was installed in 1984 and serves all areas. Additionally the fire alarm system panels have had an upgrade and a new addressable Fire Alarm Control Panel (FACP) has been installed.

Security & IT Security systems appear new and in excellent condition. Local IT was not investigated.

Electrical System Renovations

We assume the thermal envelope of the building is not being improved by the adding insulation to the exterior walls therefore the basic system capacity of existing systems matches what will be required. A significant exception is the requirement for additional fresh air ventilation to meet current codes.

The following are recommended system replacements and renovations to match the architectural renovations:

1. All new power systems: load centers, circuiting, connections to mechanical and lighting equipment, outlets and IT systems

N/S

2. All new lighting based on LED fixtures, occupancy controlled switching, and daylight controls for perimeter rooms.
3. Reuse the battery powered emergency lighting with some additional units.
4. Reuse the existing fire alarm system and devices for all renovated areas, add additional units where required.
5. Retain existing security system which likely requires some attention to existing wiring that needs to be protected during construction.
6. Due to the safety concerns regarding the FPE equipment and assuming there has been no previous testing, we recommend that the main switch gear and load centers in the Boiler room be investigated using thermal imagery and for any new panel feeders consider replacing the FPE panel that they come from
7. The building can greatly benefit from all new outside lighting fixtures: each entry, (8) wall packs for sides, drive and back of building.

Please let us know of any questions you may have.

Sincerely,
for NORIAN/SIANI ENGINEERING, INC.

Sergio F. Siani

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